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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,307	02/24/2004	Hiroshi Tabata	P69530US0	8302

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EXAMINER	
MUHAMMED, ABDUKADER S	
ART UNIT	PAPER NUMBER
2627	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/784,307	TABATA ET AL.	
	Examiner	Art Unit	
	Abdukader Muhammed	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment filed on June 19, 2007 has been considered. Claim 4 has been canceled. Claims 1-3 and 5 remain in the application.

2. Applicant's arguments with respect to claims 1-3 and 5 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Mizuno et al. (US 6,996,052 B1).

Regarding Claim 1, Mizuno et al. teach an optical disk comprising: a substrate (substrate 1; see figure 5(a) and column 14, lines 62-67); a first protective layer (first protective layer 2; see figure 5(a) and column 14, lines 62-67) formed on the substrate; a recording layer (recording layer 3; see figure 5(a) and column 14, lines 62-67) formed on the first protective layer; a second protective layer made of a material including sulfur and formed on the recording layer (second protective layer 4; see figure 5(a) and column 14, lines 62-67; and the material for the protective layer includes sulfides; see column 16 lines 9-14); a diffusion protective layer formed on the second protective layer and made of a material including at least one material among nitride, oxide and carbide (interfacial layer is formed between the second protective layer and the reflective layer; see column 24, lines 48-52 and claim 17; and the interfacial layer is formed from

oxide; see column 25, lines 1-3); and a reflective layer formed on the diffusion protection layer and made of a material including Ag or an alloy of Ag (reflective layer 5; see figure 5(a) and column 14, lines 62-67; and the reflective layer includes Ag alloy containing from *0.2 atomic % to 5 atomic %* of Ti, V, Ta, Nb, W, Co, Cr, Si, Ge, Sn, Sc, Hf, Pd, Rh, Au, Pt, Mg, Zr, Mo or Mn in Ag, is also preferred; see column 23, lines 30-33), wherein the recording layer includes a composition expressed as (Sb.sub.xTe.sub.1-x).sub.a Ge.sub.b In.sub.c in which atomic ratios are $0.77 \leq x \leq 0.84$, $0.85 \leq a \leq 0.95$, $0.01 \leq b \leq 0.10$ and $0.01 \leq c \leq 0.10$ where $a+b+c=1$. Note: this gives atomic ratio of $.6545 \leq Sb \leq 0.789$, $0.136 \leq Te \leq 0.3135$, $0.01 \leq Ge \leq 0.1$, and $0.01 \leq In \leq 0.1$. Mizuno et al. teach this composition for recording layer given as, In (0.023) Ge (0.048) Sb (0.719) Te (0.21) with the sum of 1 or 100% atomic ratio (see column 57, lines 5-10).

Regarding Claim 2, as applied to claim 1 above and Mizuno et al. further teach that the atomic ratios "b" of Ge and "c" of In have a difference $-0.05 \leq b-c \leq 0.05$ (from the above data, In (0.023) Ge (0.048) Sb (0.719) Te (0.21), *0.023-0.048 = -0.025* which is in the range given (see column 57, lines 5-10).

Regarding Claim 3, as applied to claim 1 above and Mizuno et al. further teach that the recording layer includes at least one element selected from the group consisting of Ag, Si, Al, Ti, Bi and Ga, the selected element having 3 atom % or less in the recording layer (Addition of Si less than 5%; see column 17, lines 60-61. Addition of Al and Ga less than 8%; see column 17, lines 65-67).

Regarding Claim 5, as applied to claim 1 above and Mizuno et al. further teach that the substrate has a spiral groove or concentric grooves with a depth of 20 nm $\leq$ depth $\leq$ 30 nm (spiral groove with 30 nm; see column 43, lines 55-59 and claim 22).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (US Publication 2001/0017833 A1) further in view of Sakaue et al. (US Publication 2002/0168587 A1).

Regarding Claim 1, Yamada et al. teach an optical disk comprising: a substrate (substrate 1; see figure 4 and page 4, paragraph [0096], lines 3-7); a first protective layer (first dielectric layer 2; see figure 4 and page 4, paragraph [0096], lines 3-7) formed on the substrate; a recording layer (recording layer 3; see figure 4 and page 4, paragraph [0096], lines 3-7) formed on the first protective layer; a second protective layer made of a material including sulfur and formed on the recording layer (second dielectric layer 4; see figure 4 and page 4, paragraph [0096], lines 3-7. The dielectric layer is formed from oxides, sulfides and carbides; see page 6, paragraph [0145], lines 1-5); and a reflective layer made of a material including Ag or an alloy of Ag (metal or alloy layer 5 which serves as reflective heat dissipation layer and the materials of alloy layer Al, Ag and alloys thereof; see figure 4 and page 4, paragraph [0096], lines 3-7 also page 6, paragraph [0152], lines 1-7), wherein the recording layer includes a composition expressed as (Sb.sub.xTe.sub.1-x).sub.a Ge.sub.b In.sub.c in which atomic ratios are $0.77 \leq x \leq 0.84$, $0.85 \leq a \leq .0.95$, $0.01 \leq b \leq 0.10$ and $0.01 \leq c \leq 0.10$ where $a+b+c=1$. Note: this gives atomic ratio of

.6545≤Sb≤ 0.789, 0.136≤ Te≤ 0.3135, 0.01≤ Ge≤ 0.1, and 0.01≤ In≤ 0.1. Yamada et al. teach this composition for recording layer given in percentage form as, 55≤Sb≤ 70, 22≤ Te, 0≤ Ge≤ 10, and 2≤ In≤ 10 with the sum of 100% atomic ratio (see page 3, paragraphs [0070] trough [0075]).

Yamada et al. differ from the claimed invention in that they do not specifically show a diffusion protective layer made of a material including at least one material among nitride, oxide and carbide formed between the second protective layer and the reflective layer.

Sakaue et al. on the other hand disclose an interface layer 19 formed between the dielectric/protective layer 16 and reflective layer 17 (see figure 1) made from materials including carbon (C) or a nitride, an oxide, a carbide or nitrooxide of an element a, wherein a is at least one element selected from Sn, In, Zr, Si, Cr, Al, V, Nb, Mo, W, Ti, Mg and Ge (see page 3, paragraph [0040], lines 4-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an interface/diffusion layer in the system of Yamada et al. since Sakaue et al. teach that by using this layer, it is possible to prevent the diffusion of Ag activated by oxygen and corrosion (see page 3, paragraph [0039], lines 5-8 and paragraph [0043], lines 1-4).

Regarding Claim 2, as applied to claim 1 above and Yamada et al. further teach that the atomic ratios "b" of Ge and "c" of In have a difference -0.05 ≤ b-c ≤ 0.05 (from the above data, 55≤Sb≤ 70, 22≤ Te, 0≤ Ge≤ 10, and 2≤ In≤ 10, *0-2=-2 ≤ atomic % "Ge" - atomic % "In" ≤* 12-10=2 which is in the range given (see page 3, paragraphs [0070] trough [0075]). Note that in Yamada et al. the ratios are in percentage form.

Regarding Claim 5, as applied to claim 1 above and Yamada et al. further teach that the substrate has a spiral groove or concentric grooves with a depth of 20 nm ≤ depth ≤ 30 nm (guide grooves formed in the substrate have a depth of 150 ANG.=15nm to 550 ANG.=55nm, more preferably 200 ANG.=20nm to 450 ANG.=45nm; see page 4, paragraph [0098], lines 4-7).

7. Claims 1-3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Horie et al. (US Publication 2002/0160305 A1) further in view of Sakaue et al. (US Publication 2002/0168587 A1)

Regarding Claim 1, Horie et al. teach an optical disk comprising: a substrate (substrate; see figure 19A); a first protective layer (dielectric protective layer; see figure 19A) formed on the substrate; a recording layer (recording layer; see figure 19A) formed on the first protective layer; a second protective layer made of a material including sulfur and formed on the recording layer (dielectric protective layer made from sulfide; see figure 19A and page 15, paragraph [0184], lines 5-10); and a reflective layer made of a material including Ag or an alloy of Ag (reflective layer made of metal such as Au, Ag or Al; see page 16, paragraph [0193], lines 1-3 and figure 19A), wherein the recording layer includes a composition expressed as *(Sb.sub.xTe.sub.1-x).sub.a Ge.sub.b In.sub.c* in which atomic ratios are 0.77≤ x ≤0.84, 0.85≤ a ≤.0.95, 0.01≤ b ≤0.10 and 0.01≤ c ≤0.10 where a+b+c=1. Note: this gives atomic ratio of .6545≤Sb≤ 0.789, 0.136≤ Te≤ 0.3135, 0.01≤ Ge≤ 0.1, and 0.01≤ In≤ 0.1. Horie et al. teach this composition for recording layer given in percentage form as, In (3) Ge (5) Sb (71) Te (21) with the sum of 100% atomic ratio (see page 18, paragraph [0219], lines 4-6).

Horie et al. differ from the claimed invention in that they do not specifically show a diffusion protective layer made of a material including at least one material among nitride, oxide and carbide formed between the second protective layer and the reflective layer.

Sakaue et al. on the other hand disclose an interface layer 19 formed between the dielectric/protective layer 16 and reflective layer 17 (see figure 1) made from materials including carbon (C) or a nitride, an oxide, a carbide or nitrooxide of an element a, wherein a is at least one element selected from Sn, In, Zr, Si, Cr, Al, V, Nb, Mo, W, Ti, Mg and Ge (see page 3, paragraph [0040], lines 4-7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an interface/diffusion layer in the system of Horie et al. since Sakaue et al. teach that by using this layer, it is possible to prevent the diffusion of Ag activated by oxygen and corrosion (see page 3, paragraph [0039], lines 5-8 and paragraph [0043], lines 1-4).

Regarding Claim 2, as applied to claim 1 above and Horie et al. further teach that the atomic ratios "b" of Ge and "c" of In have a difference $-0.05 \leq b-c \leq 0.05$ (from the above data, In (3) Ge (5) Sb (71) Te (21), *5%-3% = 2%, in fraction form it is 0.02* which is in the range given in the instant invention (see page 18, paragraph [0219], lines 4-6).

Regarding Claim 3, as applied to claim 1 above and Horie et al. further teach that the recording layer includes at least one element selected from the group consisting of Ag, Si, Al, Ti, Bi and Ga, the selected element having 3 atom % or less in the recording layer (for securing formation of a hexagonal crystal single phase, the total amount of the other elements is preferably not more than 3 atom %; see page 6, paragraph [0086], lines 1-5. For the list of elements see 6, paragraph [0080] and for a complete detail see paragraph [0080] through [0086]).

Regarding Claim 5, as applied to claim 1 above and Horie et al. further teach that the substrate has a spiral groove or concentric grooves with a depth of 20 nm ≤ depth ≤ 30 nm (substrate is usually provided with guiding grooves having a depth of about 10 to 80 nm; see page 15, paragraph [0183], lines 4-6).

Conclusion

8. The prior art made of record in PTO-892 Form and not relied upon is considered pertinent to applicant's disclosure.

Ohno (US 2002/0025443 A1) teaches an interlayer of oxides between the reflective layer and the dielectric/protective layer to prevent the occurrence of problems such as the diffusion of S and so on into the reflective layer of Ag to decrease the thermal conductivity and so on (see page 8, paragraph [0117]).

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) Will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Abdukader Muhammed whose telephone number is (571) 270-1226. The examiner can normally be reached on Monday-Thursday 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wayne Young can be reached on (571) 272-7582. Customer Service can be reached at (571) 272-2600. The fax number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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11 July 2007

THANG V. TRAN
PRIMARY EXAMINER